

- 14 -

CLAIMS

1. Goniometric sensor for measuring the relative rotation of a first object with respect to a second object **characterised in that** it comprises:
 - 5 - a flexible elongated element that extends between said first and said second object, said element having a neutral axis, which does not change its own length when bending, and at least one fibre spaced apart from said neutral axis that extends
10 from said first to said second object;
 - means for measuring the length variation of said fibre as the relative rotation varies between said first and said second object, said relative rotation being proportional to said length variation.
- 15 2. Goniometric sensor, according to claim 1, wherein said or each fibre is associated to a channel that runs along said fibre of said elongated flexible element, in said channel a medium being present suitable for transmitting a signal to said means for
20 measuring said length variation.
3. Goniometric sensor, according to claims 1 and 2, wherein said medium suitable for transmitting is a cable connected to a first point of the channel, and wherein said means for measuring records the movement
25 of said cable at a second point of said channel.
4. Goniometric sensor, according to claim 3, wherein said cable has an end connected to an end of said channel and the other end freely moving, said means for measuring recording the movement of the other end of the cable

- 15 -

with respect to the other end of the channel.

- 5 5. Goniometric sensor, according to claim 1, wherein said means for measuring are chosen among Hall effect sensors, optical sensors, magnetic induction sensors, piezoelectric sensors, etc.
6. Goniometric sensor, according to claim 1, wherein said bending of said flexible elongated element is carried out in a predetermined plane.
- 10 7. Goniometric sensor, according to claim 1, wherein said flexible elongated element has at least one eccentric tubular channel shifted from said neutral axis and closed at the ends, said tubular channel containing a certain amount of a compressible fluid at a measured starting pressure whereby said bending of the flexible
15 elongated element causes a pressure variation of said fluid detected by said means for measuring.
- 20 8. Goniometric sensor, according to claim 1, wherein said flexible elongated element has at least one eccentric tubular channel with an amount of incompressible fluid, a position reference element
25 being arranged at the other end, said bending of said flexible elongated element causing a variation of the distribution of the incompressible fluid in the tubular channel and then a movement of the reference element that is detected by said means for measuring.
9. Glove for goniometric measures **characterised in that** it comprises at least a goniometric sensor according to the previous claims, said goniometric sensor being arranged with an end constrained to the back of the

- 16 -

glove and extending for at least one portion of said finger or located completely on the finger.

10. Glove according to claim 9, wherein at least two goniometric sensors are used for each finger of the hand for measuring the flexo-extension of the phalanxs, and a goniometric sensor rotated of 90° about its own axis for measuring the ab/adduction of the fingers with respect to the hand.

11. Device for measuring the rotation of a wrist characterised in that it comprises at least one goniometric sensor, according to claims 1-9, arranged with an end integral to said wrist and with the other end constrained to a point of the arm that during said rotation of said wrist remains substantially fixed, said device detecting the relative rotation of said wrist with respect to said second point.

12. Device for measuring the rotation of a wrist according to claim 11, comprising furthermore two sensors at the wrist, which operate in two planes orthogonal to each other and that contain the axis of the forearm, for detecting respectively the flexo-extension and the ab/adduction of the hand with respect to forearm.

Device for localizing an object in the space by means of goniometric measures characterised in that it comprises a plurality of goniometric sensors, according to claims 1-9, arranged in series, said localisation being executed integrating the data obtained by the single goniometric sensors by means of a computing unit.